MILESTONE 4: PROTOTYPING & TESTING

~TEAM BING BONG~

A. HIGH-FIDELITY PROTOTYPE

a. User Story 1: As a visitor to the UGA campus, I want to be able to render a 360 degree view of a bus stop so that I am better able to locate it.

i. Extended Description:

On the stops screen, instead of a list of stops the user is presented with an interactable map that shows their proximity to adjacent bus stops. This design element was implemented as visitors to the UGA campus may not be familiar with the names of bus stops. Being presented with a map instead of a list of nearby stops, users will get a better grasp on the layout of the map in an easier-to-understand method (Roth). Signifiers are used to demarcate various landmarks on the map. The user's location is marked as a blue circle with an arrow showing orientation, and bus stops are marked with red circles containing white dots, similar to their appearance on the 'Maps and Directions' tab on the home page. We made this design decision because it promotes consistency and a more seamless interaction with the other existing aspects of the UGA Bus application. Ergo, the user will be able to recognize the use of the icon across different facets of the application. This consistency affords an enhanced ability to locate bus stops, as it facilitates usage. A helpful caption is below the screen, guiding the user to select a bus stop icon. Upon clicking a bus stop, a dialogue box window appears with a noticeable button stating the phrase '3D View', which, in theory, should be relatively self-explanatory. This was done to specifically target the issue that the existing solution posed, in which the feature was not easily accessible due to its inconspicuous design–it was just text, and did not indicate any affordances. Another additional button appears at the bottom of the window, which allows the user to 'navigate to the stop'. The user knows that these are buttons because across many applications, buttons tend to have a shadow underneath, implying that they are 'raised', and indicative of the pushing affordance. The design element encourages the use of the feature, as it interactively responds to the user and offers the 3d feature in the form of a conspicuous button. Consequently, this more successfully fulfills the user story. Furthermore, the additional button allows us to integrate our second solution, as it redirects the user to the 'directions' tab. A more detailed explanation for this frame is included in the second user story. When the '3D View' button is selected, the user is taken to an integrated Google Maps Street View map, showing them exactly where the bus stop is located and how it looks, and thus the user knows what their destination is. This was a main point of contention in the problem of study, as the existing solution did not house the feature in-app. The integrated map reduces reliance on out-of-app experiences, which in return reduces cluttering (Nepper). This user centric design facilitates a better overall user experience, which positively impacts the user story in general. Helpful pop ups such as the arrows on either side of the screen and the text along the bottom let the user know that the map is interactable, and that they can move it around to get an even better understanding of the location. This design element decision was made considering user intuition, as it maximizes a user friendly experience (Nepper).

ii. Video Demo: [*https://www.youtube.com/watch?v=cWTwxb2jr6Q*](https://www.youtube.com/watch?v=cWTwxb2jr6Q)

b. User Story 2: As a person on UGA campus, I want to get directions (walking, cycling, etc.) to a bus stop so that I can get onto a bus that is on that bus stop route.

i. Extended Description

Design elements in this prototype were formulated in order to utilize the user's voice to streamline the direction process, while still preserving the functionality of the other methods. This design also incorporates the idea of minimalism, as once the user selects the "Voice" tab, they are presented only with the necessary icons: the microphone, and the departing location; no unnecessary icons, tabs, or input boxes are present, which reduces cluttering and enhances usability (Abdolrahmani, et al.). This design not only benefits users that may have disabilities, but also enhances the process for the user to get directions easier. As accessibility features are concerned, the usage of a voice assistant aids people with sight impairments and the ability to successfully navigate a campus without having to rely on visual cues can improve overall user experience quality (Fabio). This was done to maximize user story success, as the process of obtaining directions is facilitated by accommodating disabilities, as well as providing an easier option for direction input even given outlier scenarios where the user is not able to type in an input. These scenarios include a user who is preoccupied (biking, jogging, etc) or where the user does not know the written name of the building and only how it sounds. On the "Voice" screen, the microphone icon is a circle with a white ring. This was done because it makes the microphone icon look more like a button that affords pushing, and when pressed the ring will turn red, denoting that it's picking up the user's voice and is being pressed. Helpful prompts require user input to allow their location services and microphone access, and design elements of the pop up were chosen to best mimic the most common format for the prototype OS. This enhances usability as the user is already familiar with the popup format and can more quickly and easily select an option. These design elements were chosen to provide a more intuitive user experience, which generally positively impacts the success of the user story. A "Location Pinpoint" icon was added to the bottom of the page, as a means for the user to be able to change their departing location since the user's location is default. Once the user provides an input, they are redirected to the directions tab. This tab was redesigned as it was an integral part of our problem of study. The existing solution does not provide in-app directions, rather it redirects users outside of the app. By integrating Google Maps into the app, it provides all vital information to the user while also maintaining continuity of usage. This seamless integration enhances usability (Nepper). The map is integrated in a (75:25) split, giving the map a fair amount of screen real estate to aid in display and readability. In order to view all of the directions, a scroll bar was added to indicate scrolling to users so that they may view information as needed. Helpful captions are included to provide the most vital information, such as destination, distance, and time without cluttering the screen with excessive data–adhering to our design philosophy of minimalism. These design elements encourage a better direction obtaining process as addressed in our problem of study and user story by providing the most minimal of interfaces (Darejeh, Ali, and Dalbir Singh).

ii. Video Demo: https://www.youtube.com/watch?v=2FFqhw2nqrQ

B. TESTING PROTOCOL

a. Testing Protocol:

i. Research Question:

Does an interactive minimalist design through the seamless integration of features and increased interactivity improve the efficacy and user experience of the UGA Bus campus navigation app?

ii. Methodology:

We will be utilizing a mixed method approach by integrating surveys into a focus group. The focus group will be able to provide us with qualitative data that allows for more personalized information to guide the development of the next prototype. The participants of the focus group will be selected so that they can be categorized into 2 groups: UGA students and UGA Visitors. This diverse group allows for multiple viewpoints without leaning on too much bias towards one demographic which helps to judge the usability and intuition of the new features among a wide variety of users. Furthermore, having a group of visitors versus students who are familiar with the campus will allow the separation of independent variables, being application design elements, so that the dependent variables of user experience and efficacy can be studied. This facilitates the establishment of a correlational relationship by controlling the environment so that the resulting fluctuation in dependent variables can be linked directly to the manipulation. Although the focus groups are blocked according to their familiarity with the campus, the participants are selected out of a random pool to enhance generalization of the results. The survey portion of the methodology will allow us to collect quantitative data across various measures of user success and provide an average score so that an empirical relationship can be established. This further bolsters the integrity of the resulting correlations.

b. Testing Procedure:

i. What is your specific plan to deal with informed consent?

In order to deal with consent, each of the participants will be informed about the nature of their tasks but not about the nature of the study. This preserves the integrity of the results such that individuals do not change their answers based on their designated app. This also does not increase any risk to the individual, which ethically allows for this redaction. The necessary information is provided to the user on a consent form, which also includes clauses that ensures the participant of anonymity with regards to any personal information. No personal information will be collected throughout the process of the testing procedure, with the only data being the participants name and signature on the consent forms.

ii. Data Collection & Organization

Each focus group is further split into 2 subgroups, A and B, where one is provided with the existing UGA bus app and the other is provided with our new prototype. The groups would be laid out as follows:

- UGA Student Existing App
- UGA Student New Prototype
- UGA Visitor Existing App
- UGA Visitor New Prototype

Then, each group will be instructed to use their designated app to locate a preselected bus stop (to control extraneous variables). The users would then answer the following questions to provide qualitative and quantitative data:

Qualitative:

1. What is something about the app that you found helpful?
2. What is something about the app that you found was not helpful?
3. What is something that you would include or remove to improve the app?

Quantitative:

1. On a scale of 1-5, with 5 being the easiest, how easily could you find the 360 degree feature?
    a. This question targets the effects of a minimalist design.
2. On a scale of 1-5, with 5 being the easiest, how easily could you use the 360 degree feature?
    a. This question targets the effects of an interactive design.
3. On a scale of 1-5, with 5 being the highest, how effective was the app in helping you locate the bus stop?
    a. This question targets the effects of a minimalist and interactive design.

The subgroups would then swap their app for their opposing counterpart and repeat this process. This allows for a cross-measurement of the data from the same participant's perspective. This process would need to be repeated with multiple groups of participants, as repetition further increases result integrity. The qualitative results would be organized into positive remarks, negative remarks, and general feedback. The quantitative data would be averaged for an overall score across 2 attributes: efficacy and usability.

iii. Data Analysis

Given that our collected data is qualitatively based as well as quantitatively based, we will be looking into descriptive analysis of user's expectations and results to summarize correlations between the improvements made, as pertaining to minimalism and interactivity, and the efficacy and overall user experience. When using qualitative metrics of feelings and experience, it can be difficult to show findings of how the application performs in a strict correlation as there is no data to do regression analysis. However, with regards to the research question, the collection of qualitative data would be of great use to understand how our integration of minimalistic features benefits the overall feel of the bus application. Participants' remarks can be reduced to positive, negative, and general, with respect to whether interactive maps and voice assistance overall improve the experience of navigation. This information can be particularly important when considering the potential development of more refined prototypes, as it provides user-specific feedback to the designers.

Quantitative data provides another avenue of analysis: establishing correlational relationships between design elements and efficacy or user experience. Numerical data can be linked to our guiding design principles by isolating the specific design elements (minimalism, interactivity) in the survey questions. By doing so, the data can be analyzed mathematically to establish a positive or negative correlational effect between each of the design element variables and efficacy or user experience. Additionally the data can be aggregated into a representation of the overall user experience to provide an objectifiable model that compares how well the prototype design elements and features affect the usability and user experience. When looking at statistics such as central tendency, variability, and frequency of the dataset, we can draw direct correlations of which features users generally liked or disliked by sampling the ratio of positive to negative scores to see if the integrated map and voice assistance was beneficial to the application.

iv. How might you conduct your testing procedure safely during a pandemic?

Testing procedures would be flexible in allowing participants to perform surveying through zoom meetings. Consent forms, the prototype and existing app, as well as survey forms will be emailed to the user, and the user will resend forms back to a designated email upon completion of the trial. Conducting through a zoom meeting allows for indirect contact with participants while still affording essential interactions such as guiding the participant through the tasks in the procedure they must complete.

C. Final Summary Video : *https://www.youtube.com/watch?v=-UZ1JjBGtfU*

D. Bibliography

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